

As a general occurrence after rains, the temperature falls temporarily and then gradually increases till the next rainfall.

There is a gradual decrease of temperature during September, October, and November; when the winds increase in velocity and rains occur the temperature falls rapidly and may produce killing frosts or even a trace of snow; then follows a general rise to the normal. Now, if a dry period sets in, the air becomes filled with dust, smoke, etc., which produce a hazy condition; but if in this period a light rain occurs the air will become clear and pure as before.

If rain falls throughout the entire period, these conditions are entirely lacking.

A gradual increase of temperature occurs usually in May. After a dry, warm period, a rain occurs, and the temperature falls sufficiently low for frost to form. This period, which Hon. J. R. Sage has so happily termed the "May Dip," occurs with much more regularity as regards time than the fall period.

Years in which the Indian Summer conditions were marked: 1873, 1874, 1880, 1884, 1886, 1887, 1891, 1892, 1895.

Years in which the conditions were slightly marked: 1872, 1875, 1876, 1879, 1883, 1885, 1888, 1889, 1890, 1896, 1897, 1900.

Years in which the conditions were entirely lacking: 1877, 1878, 1881, 1882, 1893, 1894, 1898, 1899.

HAWAIIAN CLIMATOLOGICAL DATA.

By CURTIS J. LYONS, Territorial Meteorologist.

OBSERVATIONS AT HONOLULU.

The station is at 21° 18' N., 157° 50' W. It is the Weather Bureau station Punahoa. (See fig. 2, No. 1, in the MONTHLY WEATHER REVIEW for July, 1902, page 365.)

Hawaiian standard time is 10° 30' slow of Greenwich time. Honolulu local mean time is 10° 31' slow of Greenwich.

Pressure is corrected for temperature and reduced to sea level, and the gravity correction, -0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Meteorological Observations at Honolulu, September, 1902.

Date.	Pressure at sea level	During twenty-four hours preceding 1 p. m. Greenwich time, or 1:30 a. m. Honolulu time.										Total rainfall at 9 a. m. local time.	
		Temperature.		Wind.		Sea-level pressures.							
		Temperature.	Means.	Wind.	Force.	Average cloudiness.	Maximum.	Minimum.					
	Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.	Maximum.	Minimum.			
1	*	29.97	75	60	82	73	64.5	65	ne.	5	30.03	29.94	0.02
2	29.91	75	71	83	72	65.7	68	ne.	5-4	30	30.01	29.90	0.10
3	29.91	74	71.5	83	73	71.5	83	ne.	3	7	29.97	29.88	0.14
4	29.99	73	70.5	85	73	69.5	75	nne.	3-0	3	30.01	29.89	0.00
5	29.95	77	71	85	71	68.3	73	ne.	1-3	2	30.01	29.94	0.01
6	29.95	76	69	84	74	67.3	69	ne.	3	5-2	29.98	29.89	0.01
7	29.99	76	70	84	74	66.5	69	ne.	3	5	30.03	29.94	0.01
8	29.99	76	69.5	84	74	66.7	70	ne.	3-1	3	30.05	29.97	0.01
9	29.98	75	69	83	73	66.7	72	ne.	3-4	3-5	30.03	29.96	0.27
10	29.89	75	69.5	82	71	66.5	71	nne.	3-0	5	30.01	29.89	0.06
11	29.90	72	69.5	82	71	68.0	77	ne.	2-0	7	29.96	29.85	0.25
12	29.95	68	67	84	69	70.0	81	s.	0-1	3	29.99	29.90	0.00
13	29.94	70	68.7	85	68	69.7	82	sw.	1-0	3-0	30.00	29.93	0.00
14	29.96	70	68.7	83	68	69.3	81	sw-nw.	1-0	3	30.00	29.90	0.00
15	29.94	70	68.7	83	69	69.5	78	sw.	1-0	4	30.02	29.93	0.00
16	29.95	71	69	86	69	69.7	80	n-se.	1-0	4-1	30.00	29.89	0.00
17	29.91	70	68.7	84	71	68.7	76	w.	1-0	3-10	29.96	29.88	0.00
18	29.93	69	67.8	85	69	69.7	80	se-ne.	1-0	4	29.98	29.88	0.01
19	29.93	68	67.5	83	69	69.8	87	se-ne.	1-0	0-8	29.97	29.90	0.17
20	29.83	69	68.3	83	67	69.7	85	se-ne.	1-0	1-4	29.98	29.88	0.51
21	29.84	73	70	82	68	70.0	83	se.	1-0	0-3	29.86	29.79	0.01
22	29.95	77	71.5	84	70	70.5	79	s-e.	1-0	2-10	29.99	29.89	0.27
23	29.99	77	69.5	84	73	68.7	72	ne.	3	5	30.04	29.95	0.10
24	29.96	76	68.5	83	75	65.7	66	ne.	4	4	30.04	29.94	0.01
25	29.98	76	68.5	83	75	65.5	65	ne.	4	3	30.00	29.91	0.01
26	29.99	75	69	83	75	65.6	64	ne.	4	3	30.01	29.92	0.02
27	29.98	76	68	83	74	65.5	67	ne.	4	2	30.06	29.93	0.00
28	29.94	76	69.5	82	75	65.0	65	nne.	4-3	2	30.01	29.91	0.02
29	29.93	75	69	83	75	68.2	76	ne.	3-1	3	29.98	29.90	0.23
30	29.91	73	69	82	72	67.7	74	ne.	2-0	6	29.99	29.89	0.03
31													
Sums.													2.27
Means.	29.950	73.4	69.2	83.5	71.6	68.0	74.7		1-9	3.9	29.97	29.904	
Departure.	-0.022				+2.5	+6.0			-0.1			+0.29	

Mean temperature for September, 1902, $(6+2+9+3)/4 = 77.2$; normal is 77.3. Mean pressure for September, 1902, $(9+3+2)/4 = 29.946$; normal is 29.968.

* This pressure is as recorded at 1 p. m., Greenwich time. † These temperatures are observed at 6 a. m., local, or 4.31 p. m., Greenwich time. ‡ These values are the means of $(6+9+2+9)+4$. § Beaufort scale.

Rainfall data for September, 1902.

Stations.	Elevation.	Amount.	Stations.	Elevation.	Amount.
HAWAII.			OAHU.		
Hilo, e. and ne.	Frel.	Inches.	Punahoa (W. B.), sw.	47	2.27
Hilo (town).....	100	10.15	Kulaokahua (Castle), sw.	50	1.83
Pepeekeo.....	100	12.25	U. S. Naval Station, sw.	6	1.39
Hakalau.....	200	15.03	Makiki Reservoir.....	120	3.23
Honohina.....	300	13.01	Kapiolani Park, sw.	10	0.82
Puuhohoe.....	500	19.54	Manoa (Woodlawn Dairy), c.	285	6.48
Ookala.....	400	9.38	Manoa (Rhodes Gardens).....	300	10.04
			School street (Bishop), sw.	50	2.44
HAMAKUA, ne.			Insane Asylum, sw.	30	1.83
Kukaiāau.....	250	8.34	Kailihi-Uka, sw.	260	6.22
Paauli.....	750	6.30	Nuuuanu (W. H. Hall), sw.	50	2.36
Pauau (Mill).....	300	5.30	Nuuuanu (Wyllie street).....	250	3.62
Honokā (Muir).....	425	6.00	Nuuuanu (Elec. Station), sw.	405	5.22
Kukuihaele.....	700	5.12	Nuuuanu (Luakaha), c.	350	10.02
			Waimanalo, ne.	25	1.53
KOHALA, n.			Maunawili, ne.	300	6.74
Niulil.....	200	5.37	Kaneohe, e.	100	5.46
Kohala (Mission).....	521	4.63	Ahuimanu, ne.	350	9.37
Kohala (Sugar Co.).....	235	4.90	Kahuaku, n.	25	5.48
Hawi Mill.....	600	4.48	Ewa Plantation, s.	60	1.04
Puuhue Ranch.....	1,847	2.99	Waipahu.....	200	0.59
Waimea.....	2,720	2.66	U. S. Experiment Station.....	350	2.84
			KONA, w.	50	0.72
Holualoa.....	1,350	10.27	Nahuna (Laniakae).....	1,150	7.68
Kealakekua.....	1,580	9.18	Tantalus Heights.....	1,360	6.93
Napoopo.....	25	5.11			
			KAU, se.		
Kahuku Ranch.....	1,680	3.85	Lihue (Grove Farm), e.	200	2.12
Honuapu.....	15	3.82	Lihue (Molokoa), e.	300	3.12
Naalehu.....	650	2.75	Lihue (Kukaua), e.	1,000	7.77
Hflea.....	310	2.30	Kealia, e.	15	1.48
Pahala.....	850	3.31	Kilauea, ne.	325	2.31
Moaula.....	1,700	4.85	Hanalei, n.	10	3.59
			Eelele, s.	200	0.78
PUNA, e.			Volcano House.....	4,000	5.00
Olao, Mountain View.....	1,690	13.86	Wahiau Mountain, s.	2,100	10.20
Kapoho.....	110	10.80	McBryde (Residence).....	850	3.81
			Lawai.....	15	4.04
			East Lawai.....	800	3.68
			West Lawai.....	200	2.76

NOTE.—The letters n, s, e, w, and e show the exposure of the station relative to the winds.

GENERAL SUMMARY FOR SEPTEMBER, 1902.

Honolulu.—Temperature mean for the month, 77.2°; normal, 77.3°; average daily maximum, 83.5°; average daily minimum, 71.6°; mean daily range, 11.9°; greatest daily range, 17°; least daily range, 7°; highest temperature, 86°; lowest, 67°. Barometer average, 29.946; normal, 29.968; highest, 30.06, 26th; lowest, 29.79, 20th; greatest 24-hour change, that is, from any given hour on one day to the same hour on the next, .11; lows passed this point on the 10th, 20th and 30th; highs on the 7th, 14th and 26th. The barometer has been below the normal since the month of May; the average for the nine months of this year is also low.

Relative humidity average, 74.7 per cent; normal, 68.5 per cent; mean dew-point, 68°; normal, 66°; mean absolute moisture, 7.51 grains per cubic foot; normal, 7 grains; dewy mornings continuously, 11th to 21st.

Rainfall, 2.27 inches; normal, 1.98 inches; rain record days, 22; normal, 18; greatest rainfall in one day, 0.51, on the 20th; total at Luakaha, 10.02 inches; normal, 10.21 inches; total at Kapiolani Park, 0.82 inch; normal, 0.38 inch.

The artesian well level fell during the month from 33.10 to 32.95 feet above mean sea level. September 30, 1901, it stood at 33.20. The average daily mean sea level for the month was 9.68 feet, the assumed annual mean being 10.00 feet above datum. For September, 1901, it was 10.46. Trade wind days, 19 (3 of north-northeast); normal 26. Average force of wind during daylight, Beaufort scale, 1.9. Average cloudiness, tenths of sky, 3.07; normal, 4.0.

Approximate percentages of district rainfall as compared with normal: Hilo, 160 per cent; Hamakua, 300 per cent; Kohala, 165 per cent; Waimea (Hawaii), 200 per cent; Kona, 125 per cent; Kau, 200 per cent; Puna, 190 per cent; Maui, 175 per

cent; Oahu, 125 per cent, excepting Kahuku, 270 per cent; North Kauai, 60 per cent; South Kauai, 125 per cent. The rains were quite evenly distributed through the month.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, mean maximum, 81.3°; mean minimum, 71.6°; Waimea, Hawaii, 2,730 elevation, 81.6° and 64.7°; Kohala, 521 elevation, 80.8° and 68.4°; Waiakea, Kula, Maui, 2,700 elevation, 81.8° and 62.0°; Ewa Mill, 50 elevation, 86.0° and 69.8°; United States Experiment Station, 85.9° and 71.4°; United States Magnetic Station (near Ewa), 50 elevation, 89.8° and 69.8°; W. R. Castle, Honolulu, 50 elevation, highest, 86°; lowest, 68°; mean, 77.1°.

Ewa Mill mean dew-point, 66.4°; mean relative humidity, 68.2 per cent; United States Magnetic Station, 67.7° and 68.0 per cent; Kohala, Dr. B. D. Bond, 68.5° and 84.0 per cent.

Earthquakes reported: Pepeekeo, 24th, 9:30 p. m., and Hilo, 28th, 6:13 a. m., smart shock, "severest in six years;" Kealakekua, 19th, 5:30 p. m.; Waimea, 26th evening, 27th evening, and the morning of the 28th. During the first half of the month the molten lava disappeared from the pit in Kilauea; on the 16th active again and rising, light visible at 30 miles distance. The glows brighter than in August.

Light fall of snow on Mauna Kea, 20th. No electric storms noted. Heavy surf, 1st to 4th, and 27th. Tidal wave on Puna coast, southeast Hawaii, on 2d. Calm weather 10th to 21st, without trades.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. When the author of an article is not known the title is preceded by a —.

- Scientific American.* New York. Vol. 87.
— Temperature and Humidity Regulators. P. 201.
Collins, Frederick. Some New Detectors for Wireless Telegraphy. Pp. 220-221.
Hall, Alfred E. Curious effect of Lightning on a Brick Chimney. P. 336.
Fyfe, H. C. Experiments at St. Catherine's with Fog Signals. P. 240.
— Commercial Utilization of Atmospheric Elements. Pp. 254-255.
Scientific American Supplement. New York. Vol. 54.
Dewar, James. History of Cold and the Absolute Zero. Pp. 22386-22387; 22370-22371; 22406-22407.
— Cold Weather and Belated Crops in Germany. P. 22412.
Mott, S. D. Aerodromes. Pp. 22416-22420.
Philosophical Magazine. London. 6th series. Vol. 4.
Everett, J. D. On the Comparison of Vapour-Temperatures at Equal Pressures. Pp. 335-338.
Edser, Edwin. The Diffraction of Light from a dense to a Rarer Medium, when the Angle of Incidence exceeds its Critical Value. Pp. 346-352.
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Sherborn, C. Davies. Effect of a Lightning Flash. P. 492.
— Convention of Weather Bureau Officials. Pp. 543-544.
Terrestrial Magnetism. Baltimore. Vol. 7.
Nippoldt, A. Ueber die meteorologische Natur der Variationen des Erdmagnetismus. Pp. 101-114.
- Beattie, J. C.** Work in Terrestrial Magnetism and Atmospheric Electricity in South Africa. Pp. 114-115.
Geographical Journal. London. Vol. 20.
Andersson, J. Gunnar. The Winter Expedition of the "Antarctic" to South Georgia. Pp. 405-408.
— The Arctic Expeditions—Return of Sverdrup, Peary, and Baldwin. Pp. 434-438.
— The Scottish National Antarctic Expedition. Pp. 438-440.
Journal of Geography. Lancaster. Vol. 1.
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Scottish Geographical Magazine. Edinburg. Vol. 18.
Bruce, W. S. Scottish National Antarctic Expedition. Pp. 536-543.
American Inventor. Washington. Vol. 9.
McAdie, Alex. C. Fog Studies. Pp. 209-214.
Astrophysical Journal. Chicago. Vol. 16.
Very, Frank W. The Absorptive Power of the Solar Atmosphere. Pp. 73-92.
Peters, G. H. Some results of the Total Eclipse in Sumatra of May 18, 1901, obtained with the Photoheliograph at Fort de Koch. Pp. 92-97.
Symons' Meteorological Magazine. London. Vol. 37.
Lockyer, Norman, and Lockyer, William J. S. A Short Period of Solar and Meteorological Changes. Pp. 120-122.
— An African Rainmaker. Pp. 122-124.
Proceedings of the Royal Society. London. Vol. 70.
Travers, Morris W.; Senter, George; and Jacquierod, Adrien. On the Measurement of Temperature. Pp. 484-491.
Aeronautical Journal. London. Vol. 6.
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Ciel et Terre. Bruxelles. 2^eme Année.
W., P. Notes sur les éruptions du mont Pelé. Pp. 374-382.
Revue Scientifique. Paris. 4^eme série. Tome 18.
B., L. La météorologie des États-Unis en 1901. Pp. 400-401.
Annuaire de la Société Météorologique de France. Paris. 50^eme Année.
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Comptes Rendus de l'Académie des Sciences. Paris. Tome 135.
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Jodin, Victor. Sur la durée germinative des graines exposées à la lumière solaire. Pp. 443-444.
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Guillaume, J. Observations du soleil faites à l'Observatoire de Lyon pendant le premier trimestre de 1902. Pp. 523-525.
La Nature. Paris. 30^eme Année.
Perand, H. Nouveau composé volatil dans l'air atmosphérique. P. 198.
Corbigny, Brossard de. Cerf-volant porte-amarres de sauvetage et de sport. Pp. 219-222.
Archives des Sciences Physiques et Naturelles. Genève. 4^eme série. Tome 14.
Rabot, Charles. Essai de chronologie des variations des glaciers. Pp. 133-150.
Meteorologische Zeitschrift. Wien. Band 19.
Sprung, A. Photographische Aufnahmen des Sonnenring-Phänomens vom 13 März 1902, zu Potsdam. Pp. 345-348.
Goeldi, E. A. Zum Klima von Pará. Pp. 348-366.
Hergesell, G. Vorläufiger Bericht über die internationale Ballonfahrt vom 6 März 1902. Pp. 366-367.
— Täglicher Gang der meteorologischen Elemente am Observatorium auf Mauritius. P. 367.
— Täglicher Gang des Luftdrucks und der Temperatur zu Rosario, Argentinien. Pp. 367-369.
MacDowall, Alex. B. Mond und Wetter. Pp. 369-370.
Maurer, J. Meteorologische Station St. Gotthard-Hospiz. Pp. 370-371.
— Der Mai 1902. P. 371.
Fényi, J. Ueber den Gewitterregistrator in einer neuen sehr einfachen Form. Pp. 371-372.
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